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UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF ANIMAL INDUSTRY

RAISING LINK

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INTRODUCTION

History

Raising minks in captivity for their fur in the United States dates back to 1886. The degree of interest in the enterprise was for a time dependent more upon the pressure applied by promoters than upon the prices received for the skins. In later years, however, the accumulated knowledge of proper methods of breeding, feeding, and management has put operations on a sounder basis because of the greater number of skins that can be produced, the improved quality of pelts, and the lower costs resulting therefrom. The first ranch-raised mink skins were of a decidedly inferior quality, but in recent years the average quality of natural colored skins produced on farms is superior to that of skins taken in the wild. This is to be expected because observant and efficient mink raisers can improve the quality of their animals by controlled selective matings, proper and regular feeding, and intelligent management. Mink raisers during the last 5 years have become particularly interested in raising mutations of various colors.

Mink is a high-quality fur used primarily for coats, capes, and trimmings. Prosperous times are conducive to increased utilization, and new uses and improved styling will expand the market.

Basic Considerations

According to the 1940 U. S. census there were 2,836 mink farms in 42 States; on April 1, 1940, there were 161,457 female minks more than 3 months old; and the number of minks of both sexes pelted in 1939 was 291,324. Wisconsin, with 565 mink farms, led all the States, having had 44,437 mature female minks and having pelted 93,500 animals in 1939. Minnesota, New York, and Oregon were second, third, and fourth, respectively, 24,450 minks having been pelted in 1939 in Oregon. There was some expansion in mink production in 1941, but World War conditions in 1942 so affected the price of mink pelts that many more mink ranchers than usual did not make a profit. It has been estimated that 500,000 mink pelts were produced on farms in the U. S. during 1945 of which about 8% were mutations. The OPA regulations at first restricted skin prices to a specific period but these regulations were later modified to permit sales at a higher price commensurate with improved quality due to selective breeding. Still later, ranch mink skins were taken out from under OPA control. In the early months of 1946 choice bundles of ranch-raised natural colored mink skins were selling for \$45.00 per skin in the U. S. fur auctions. Some mutation mink skins were bringing above \$100 per skin. These high prices were undoubtedly due in part to high wages, and limited supply and variety of goods for which they could be spent. However, readjustment is expected to bring the prices of mink skins to lower levels.

The history of all business undertakings has demonstrated that eventually the number of interested persons reaches a point where a certain percentage who are inefficient produce at a loss. Mink raising is no exception. There should be, however, a satisfactory market for high-quality mink pelts at any time. Any person who contemplates entering this business should bear in mind the fact that it does not yield quick riches. The permanent basis is found only in the market skin produced under constantly increased and keener competition. Good judgment dictates, therefore, that a person should begin raising minks only if he is determined to make the undertaking permanent on the basis of profitable pelts.

Some States still require licenses for raising fur animals in captivity. Information on this matter can be obtained from the State Game Commissions. Some towns also have restrictive ordinances.

If after due consideration these general points have been satisfactorily analyzed, the prospective mink raiser can then consider the details.

LOCATING THE RANCH

The beginner should be guided by these general principles in selecting a location for his mink ranch.

In the United States most of the ranch-raised minks are produced either in the northern half of the country, elsewhere at high altitudes or in cool, humid regions near large bodies of water; the colder climates and shore areas apparently tend to cause a better development of fur.

Sub-marginal land is adequate for raising minks. Soil that is sandy or a sandy loam in texture is advantageous in providing good drainage. It is best to place pens and buildings on gentle slopes where the snow does not drift too deeply and where surface water runs off quickly.

Minks do not require running water in which to swim; in fact, many mink raisers believe it to be harmful to the production of good pelts, and apt to cause pneumonia. An adequate supply of good water, however, is necessary for the proper mixing of feed, complete sanitation, and proper refrigeration. The location of cold storage facilities in nearby towns will provide additional facilities in case the refrigeration system on the home ranch fails to function properly.

As raw meat and packing-house byproducts, or these and fish or fish scraps, usually constitute more than 50 percent of the mink ration, a cheap source of supply should be available. Recently cooperative fur animal feed mixing and distributing plants have been organized. Locating the mink farm along a route supplying such services may reduce the feed costs and the necessity of installing expensive refrigeration equipment. A source of adequate and cheap electrical power will make for economy and efficiency of ranch operations.

EQUIPMENT

Individual Pens

Many types of pens are in use and have proved satisfactory. It is best to provide a pen for each breeding animal, male or female.

The individual type pen, as the name implies, is designed for one mink. Pens of this type are inexpensive and easy to construct. They are relatively light and can be moved easily. The caretaker, however, is afforded no protection from the weather and the expense of upkeep, and repair of such pens is rather large. Individual pens can be made by shaping 16-gage, 1-inch mesh, woven wire, galvanized after weaving, into boxlike enclosures 4 feet long, 1½ feet wide, and 14 to 18 inches high; wire ends are added, and a hole is cut in one end to allow access to the nest box, which is hung securely on the outside. Pregnant minks should have considerably larger pens to accommodate the young when about 5 weeks old. An opening in the top of the pen or at one end may be provided for convenience in feeding or catching the animals. All openings should be properly reinforced with wooden strips on the outside. All rough, twisted ends of wire should also be on the outside.

The nestbox opening and the corresponding one for the pen should be $3\frac{1}{2}$ to $4\frac{1}{2}$ inches in diameter, depending upon the size of the mink. If desired, such openings may be covered with galvanized sheet metal to prevent chewing, since such rough surfaces may cause considerable damage to the pelt. Exposed wooden surfaces should also be protected from chewing by covering with either galvanized sheet metal or wire mesh.

Individual pens are generally constructed without legs. If placed on two-by-four frames fastened to locust, cedar or steel posts which have been set in the ground, such pens acquire a semi-permanent character, are largely self-cleaned, since they are located above ground, and present a uniform appearance. The pen may be attached by means of staples to four legs, or stakes, driven into the ground. Thus it can easily be lowered and kept on the ground from 1 week before to 3 weeks after whelping, so that the young will not fall through the wire and be lost. Removable solid floors will accomplish the same purpose. Tubular wire pens of approximately the same dimensions have been used also. Some ranchers wishing to expand from the exposed individual pens, house their individual pens in open-sided sheds, which furnish weather protection, at fairly low cost.

Colony Houses

Colony houses also permit the individual penning of animals, but each pen is an integral part of the building, and large numbers of animals are thus housed under roofed, protective sheds where they can be easily cared for. Colony houses require a greater initial outlay of capital, but because of their permanency the actual yearly cost of penning a mink, when considered over a long period of time, is no more than that of the individual cage. In addition, the caretaker is well protected from the weather during much of the time he is working.

Colony houses or sheds have given excellent service at the U. S. Fur Animal Experiment Station, Saratoga Springs, N. Y. Each building is 120 feet long, 15 feet wide and contains a total of 160 pens, 80 on each side. Each colony house has a 5-foot escape proof alley. The floor, top, and outside end of the pens are made of 16-gage, 1-inch hexagonal-mesh wire, galvanized after weaving, and the floors are approximately 2 feet above the ground. The pens are 5 feet long, 18 inches wide, and 14 inches high and have solid wooden partitions made from 1-inch dressed shiplap. Wooden partitions are preferred to those of wire, not only because they prevent fighting between animals of adjoining pens, but primarily because the nervous running actions of any one individual is hidden from the others. This is particularly desirable during the whelping and suckling periods, when one hungry, squeaking kit can soon have the entire house aroused and excited. If the partitions of the pens are made of wire instead of shiplap, they should be double and about 4 inches apart to prevent the animals from fighting through the wire.

About half of each pen extends beyond the roof of the colony house to provide sunshine for the health and sanitation of the breeding stock. Artificial shade when needed may be provided by roofing paper. A wire-hinged lid for that part of each pen under the roof facilitates watering, feeding, or when necessary, catching the minks. The end of the pen under the roof is made of lumber to provide a place for hanging nest boxes. A round hole $3\frac{3}{4}$ inches in diameter is made about 5 inches from the floor as an entrance to the nest box. The edges are covered with metal to prevent the minks from chewing the wood and the rough edges from rubbing the fur. A metal slide for confining the minks to the nest box when desired and a solid temporary floor for these elevated pens during the first four weeks after whelping should be provided.

Guard Fence

Properly constructed, a guard fence surrounding the entire unit can pay for itself in a relatively short time by preventing the loss of any mink that accidentally escape from their pens. Such a fence should be about five feet high, with posts of locust, cedar, or some other durable, long-lasting wood, strong corner and gate posts. All should be 7 or $7\frac{1}{2}$ feet long, depending upon whether set 2 or $2\frac{1}{2}$ feet in the ground. Brace posts should be set 12 and 10 feet respectively from the corners and gates, while line posts may be placed at 10-foot intervals. Spruce, pine or hemlock 4" x 45" are satisfactory for use as braces. All post tops should be sawed to the same height and at a slight angle so water or melting snow will run off quickly.

Two 2" x 4"s, one at the top of the posts and the other about 14 inches lower and fitting flush with the inside face of the posts form the framework, will hold the posts rigidly in place and furnish a nailing surface for the galvanized sheet metal and the top of the wire mesh.

Hexagonal 16 gauge, 1-inch wire mesh, 5 feet wide, which has been galvanized after weaving, 1" mesh welded wire, or 1" mesh chain link fencing, depending on cost and availability, should be nailed to the inside of each post and to the lower of the two 2" x 4"s. About 4 feet of this mesh will form the wall wire of the guard fence while the remainder, bent at right angles to the posts and extending slightly below the surface of the ground, forms the carpet in the inside. Dirt and small stones placed on the carpet hold it firmly in the ground and make the pen escapeproof. If desired, the guard fence can be constructed of 1-inch mesh, 4 feet high, with an 18-inch carpet of the same material. The carpet wire may be attached to the wall wire by means of hog rings.

A 14-inch sheet of 28 gauge, galvanized sheet metal should be nailed to both the 2" x 4"s, thus presenting a smooth surface to any mink attempting to escape. Some guard fences are provided with a galvanized sheet metal overhang on the inside and at about a 60° angle.

Nest Boxes

A wooden nest box that has proved satisfactory at the Fur Animal Experiment Station for the colony-type house is 10 inches square and 18 inches deep, with the entrance 11 inches from the bottom. This depth prevents the young minks from crawling out before they can take care of themselves. An inner removable lid to the nest box is made of wire on a wooden frame. This is fastened down with metal turn buttons. The solid outer lid is fitted so as to leave a ventilation space on each side. The darkness thus provided gives seclusion to the minks. These nest boxes rest on a 1" x 2" strip at the required height and are hooked to the sheltered end of the pen.

A commonly used type of outdoor nest box has a gable roof with entrances at the peak at each end. One side of the roof is hinged at each end by means of a small triangular piece of galvanized sheet iron attached at the gable edge of the movable side by two nails and to the edge of the stationary side by one nail near the extreme point of the metal. This permits half the roof to be lifted for putting in bedding or for examining the animals. The body of this nest box is about 10 inches square and 16 inches deep. It is set inside the individual outdoor pens and may be laid on its side to make it easier for the young minks to enter.

Other Equipment

Fresh drinking water should be available, and this may be provided by designing the drinking pan or the opening so that the animal cannot get into the water. The colony houses at the U. S. Fur Animal Experiment Station have been equipped with 3/4 inch galvanized iron pipes placed on the top of a series of pens and drilled with holes at desired intervals just above an envelope type of container hung on the side of the pen 3 inches from the top. These holes should be 1/16 inch in diameter near the place where water is turned on and should be increased by 1/32 inch for each 50 feet of pipe. A half turn of the pipe after drilling directs the water flow into the containers. By this system the entire unit of pens can be watered in a few minutes.

A cage or metal box 5 inches square and about 15 inches long made of 1/2-inch-mesh hardware cloth is useful in confining a mink so as to permit a more careful examination of the fur. A sliding metal end and a substantial handle should be provided for ease in confining and carrying the animal. A net with a wooden handle will be handy for recapturing any mink that may get loose in the alleyway.

SELECTION OF STOCK

General Points

The original stock should be purchased from some reliable breeder. The names and addresses of breeders may be obtained from State, regional, or National fur farmers' organizations, a list of which is contained in A.H.D No. 81, Fur Farm Associations, which may be obtained free from the Department of Agriculture. The Department of Agriculture does not maintain a list of breeders nor does it furnish information as to the integrity or financial standing of any individual or concern.

In the selection of stock, besides knowing the individuality of the animals, particular attention should be given to an adult's past breeding performance, or in the case of a kit, to the prolificacy of the parents, and to constitutional vigor and freedom from disease. Most satisfactory results will be attained by the beginner if one male is bought for every two females. Later it may be found that fewer males are needed. Good, selected breeding stock will cost two or three times the value of the pelt it carries. It will pay to invest only in high-class animals. If the individual mink rancher has established a ranch on the basis of fine quality pelts he should follow a program of continuous herd improvement and during times of depression eliminate ruthlessly any animals that do not measure up to the highest standards. With the return of normal economic conditions he should then be in a position to expand rapidly with choice quality animals.

A few years ago there was considerable controversy about the relative qualities of Eastern, Yukon, and Labrador strains of mink. In more recent years these strains have been crossed to such an extent that their differences are rapidly being eliminated. Male minks are much larger than females. Fine-quality animals with a thin but not papery skin, dense fur of rich tones of the desired color, the underfur having a typical color and appearance throughout its entire length, are desired. This combination gives contrast or character to mink skins. A banded underfur or one showing a faded off-color at the tips is very undesirable. The guard hair should be thick enough to give a nice coverage or veiling of the underfur. Pelts having underfur about 5/8 of an inch long and guard hair approximately half again as long are the most valuable on the market. All these points can best be judged in the fall, just before pelting time.

The foundation of the mink industry is the standard or natural colored mink, not only because 80 percent are of this color but also because those desirable qualities other than color must be built into the mutations of various kinds from the better herds of natural mink. The darker skins having the general dark chocolate color and having a slate blue underfur should be selected as breeding animals.

Mutations

It is generally considered advisable for a beginner to acquire his husbandry knowledge with natural colored mink since breeding animals are not so expensive. One can digress from these to any of the mutations by purchase of males of the more expensive mutations. It is possible, through additional years of selective breeding, the qualities of each kind of mutation will be so improved that resort to back crossing to the natural mink will no longer be necessary. The general principles of the laws of inheritance must be understood to recover the proper colors from subsequent matings (see below). Quicker progress will be made, however, if pure breeding mutations (without lethal factor) are purchased as the initial stock. The better ranchers having mutations are continually breeding their strains to higher levels of quality.

The Silverblu was the first mink mutation to be produced in quantity. Both guard hair and underfur are blue in color. About 50,000 Silverblu skins will be produced in 1946. There are three different classifications in the show—dark, medium, and light. The medium shade is most desirable at present. Silverblu is recessive to normal color in minks and consequently animals showing this color will breed true.

Another recessive of recent origin is the pastel or blond. As the name implies it is a diluted brown. The first auction sale was in 1945 with an offering of only 2500.

The first dominant mink mutation to be developed commercially was the Black Cross. Some skins (known as Royal Kohinur and Kohinur) were offered for sale in 1945. This is essentially a white animal with varying degrees of black and also white guard hairs distributed along the back and sides, which form a cross at the shoulders. A uniform, rather than a patchy distribution of these guard hairs is desirable. The spotting effect should be avoided. Later studies showed that the commercial skins are from hybrid animals, i.e. carrying factors for natural color. The pure Black Cross animal is all white except for small, dark areas on head and rump. Since Black Cross is dominant to natural color in mink, a large number of the Kohinur skins (hybrid Black Cross) can be produced by mating a pure Black Cross male to natural colored females.

Blufrost (known also as Silver Sable) is dominant to natural color in mink. Animals are thought to exist only in the hybrid condition since those pure for this characteristic apparently do not survive. The degree of silvering varies considerably and the colored guard hairs vary from brown to very dark. Some of the guard hairs are silvered and the under fur is lighter blue in color than that of the natural colored mink.

Other mink mutations are being developed (both recessive and dominant) as well as combination of all of them. The average breeder will do well to leave this experimental breeding to the more experienced. It is confusing that in some cases different names apply to the same mutations.

The Mutation Mink Breeders Association has controlled the marketing of mutation mink skins through the large fur auction companies. Such concentration of widely varying skins from small producers permits of sale lots of matched skins. The skins at present are being sold dressed. The Mutations Breeders Association has also put on an extensive advertising campaign.

Beginners in mink raising will do well to depend upon the judgment of reliable, experienced mink ranchers in selecting the best type of animals. Much valuable information can be obtained by visiting some of the best ranches and raw-fur houses making a specialty of mink skins, and by attending live-mink and pelt shows and fur-auction sales.

FEEDS AND FEEDING

Feeds

Minks are carnivorous animals, i.e. flesh eaters. The major portion of the ration, therefore, is made up of muscle meat and various organs of horses, cattle, or sheep and of fish. There is competition for this feed by dog-food manufacturers. Horses are most commonly used because of their cheapness. The use of horse meat for shipping to Europe has affected prices but horses may be purchased direct from nearby farmers who may desire to sell the useless or disabled ones. During the fall of the year the animals are more abundant. Horses (and cows) that have died from any cause, known or unknown, should never be used unless under the most exceptional circumstances, and then only on a "trial" basis with a few minks. Animals suffering from generalized blood stream infections, fistula, poll evil, and running pus infections should not even be considered as possible sources of mink food. The mink rancher has too much at stake to risk the loss of even a small percent of his animals in such a gamble.

The meat is usually boned out and ground to be frozen in slabs. Ground bone can be handled better separate from the meat, as it tends to sour. Some of the larger ranches grind meat and bone together direct from the carcass.

In order to avoid the unpleasant task of slaughtering, the meat and the by-products may be purchased from other mink ranchers or cooperative associations. The local butcher frequently has by-products not used for human food but caution should be exercised to avoid any meat contaminated through careless handling. Some of these are lungs, tripe, spleens, udders, liver, gullets, kidneys and hearts. The cheaper fish is widely used in feeding mink and also the trimming from filleting. Smelts, herring, carp, sucker, cod, haddock, flounder, and buffalo fish are among the most common. Relative price is a determining factor in their use.

Chicken or turkey heads (with beaks chopped off) and entrails make good mink feed and also jack rabbits and muskrat carcasses (during trapping season) are good. This material should be fresh and handled in a sanitary manner.

Though minks are meat eaters, some cereal grains should be included in the ration. If purchased separately for home mixing, these may include stale bread and cake, bread crumbs, waste products from manufacture of cereals for human consumption, oatmeal, or cereal grains processed especially for dog or fur animals feed. Desiccated meat products such as beef meal, and tankage, and also fish meal, soybean meals, linseed meal, and similar products are used in mink feeds. Many feed companies now make a prepared mink meal to be added to the raw meat and fish part of the ration.

These prepared feeds are advertised as carrying the vitamins and minerals considered to be required by fur animals. The home-mixed ration should contain vegetables (lettuce, carrots, or tomatoes). Vitamin concentrates are advisable particularly during the breeding season.

Preparing Rations

There are large numbers of diets of varying ingredient and percentage composition in use today that have proved very desirable and entirely satisfactory for the feeding of mink. The fact that many ranchers can feed diets differing so widely in composition is additional proof that the mink can utilize a wide range of nutritive ingredients. Those products satisfactorily utilized by the mink which are economical and easy to obtain should be used to the greatest extent possible in making up the ration to be fed. Table 1 lists a number of suggested rations.

Several experiments have been conducted at Saratoga Springs, N. Y. to determine the advisability of using certain desiccated products as partial substitutes for the raw meat portion of the mink ration. These experiments have indicated that the large amounts of meat now fed are not only unnecessary in producing good skins, but add considerably to production costs. Beefmeal, soybean meal, fishmeal, corn-gluten meal, tripe, canned fish, lungs, cottonseed meal, and peanut meal, used at one time or another as replacements of one-half the meat of the summer mink ration, have proved entirely satisfactory and very economical.

If fresh-water fish, particularly suckers, smelts, buffalo fish, carp, and red horse are used in the mink diet, it is advisable to cook them under pressure for at least 20 minutes before using. Such action destroys certain enzymes present in the fish viscera which in turn destroy any vitamin B₁ that may be present in the other ingredient constituents. Without adequate vitamin B₁, mink soon develop deficiency symptoms, become paralysed, and die. One other method by which a vitamin B₁ deficiency can be avoided, even though fresh-water fish are fed, is to use the fish in the diet one day, and meat and liver the next.

Feeding Schedule

An adult mink will consume from 5 to 9 ounces of food per day, depending upon the season of the year, the sex of the animal, the composition of the diet, and the individual needs of the animal. It is desirable at all times to keep the animals in a thrifty but not overly fat condition. There is a strong tendency among ranchers to overfeed, particularly during the breeding and gestation periods, with the result that many females become sluggish, inactive, very fat, and fail to raise their young. females just slightly on the hungry side will keep up the herd average of young whelped per female.

Many mink farmers feed mature animals only once daily during late summer, fall, and early winter. This system saves labor. When possible, however, it is desirable to feed twice daily—once in the early morning, and again in the late afternoon. Such a practice prevents excessive drying out of the food in the hot days of summer, and long periods without food in the winter, when allotted food becomes frozen and unavailable to the mink. In addition, feeding twice daily results in fresh, palatable food, and discourages deposition of fly eggs.

TABLE 1

Suggested rations

Ingredient	Ration 1	Ration 2	Ration 3	Ration 4
	<u>Pounds</u>	<u>Pounds</u>	<u>Pounds</u>	<u>Pounds</u>
Horsemeat.	17.0	25.0	15.0	10.0
Fresh or frozen liver.	---	10.0	5.0	5.0
Blood.	---	5.0	5.0	---
Lungs, tripe, udders, ocean fish,				
chicken heads, canned fish,				
canned chicken waste	37.5 ^{1/2}	10.0	15.0	10.0
Cereal mixture	10.3 ^{2/3}	20.0 ^{3/4}	25.0 ^{3/4}	25.0 ^{3/4}
Tomatoes, carrots, apples,				
lawn clippings, vegetables	3.4	5.0	5.0	10.0
Steamed bonemeal	0.3	1.0	1.0	1.0
Fortified codliver oil	0.2	0.4	0.4	0.4
Beefmeal, fishmeal, corn-gluten meal,				
cottonseed meal, or peanutmeal	---	---	---	6.0
Water or skimmilk.	31.3	23.6	28.6	32.6
Total:	100.0	100.0	100.0	100.0

Ration No.1 is fed during the summer, fall and early winter on a large mink ranch in New York State.

Ration No.2 is recommended for adult mink January 1 to July 1, and mink kits from weaning to September 15.

Ration No.3 is recommended for adult mink July 1 to pelting, and mink kits from September 15 to pelting.

Ration No.4 is a sample of "low meat" ration fed to experimental kits and adults during summer, fall, and early winter for several years at Saratoga Springs, N. Y.

1/ Consists of tripe 22.1 pounds, lungs 3.4, fish racks 2.1, chicken heads 6.2, and canned chicken waste 3.5 pounds.

2/ Made up of commercial cereal 8.3 pounds, liver A 0.7, brewer's yeast 1.0, and powdered milk 0.3 pounds.

3/ The cereal mixture may consist of commercial feeds or a home-prepared mixture similar to one of the following:

	Dry mixture number		
	1	2	3
	<u>Pounds</u>	<u>Pounds</u>	<u>Pounds</u>
Breadmeal, corn-flake waste, rice crispies,			
cookie crumbs, shredded-wheat waste.	150	200	150
Oatmeal.	150	---	150
Wheat-germ meal.	50	50	50
Vacuum-dried fishmeal.	100	50	25
Inactive yeast	---	75	25
Alfalfa leafmeal	50	50	---
Skimmilk powder.	---	50	---
Corn-oil cake meal	---	100	---
Soybean meal	---	---	50
Beefmeal	---	---	50
Total:	500	575	500

Approximately one-third of the total daily food allotment should be allowed each mink so that the entire amount is consumed an hour or so before the next meal is due. The mink rancher should keep his animals active, interested, and waiting for the next meal. They should be hungry but not so much so that they dash frantically back and forth in the pen. This means that the feeder must regard every animal as an individual.

Adult females should be fed ration No. 2 or one similar to it from January 1 until their young are weaned in late June or mid-July. The weaned young should be continued on the same diet until mid-September or early October. After the young are weaned it is advisable to change the adults over to rations 3 or 4, or to one similar in composition to them. At this time the adults are entering the resting or maintenance stage of the reproductive and fur growing cycles, and their nutritional needs are lower than at other stages of their life cycle. Weaned mink kits can likewise be changed over to rations 3 or 4 after they are 4 months of age and have completed the period of most rapid growth. It is very desirable to provide adequate feed for necessary growth of both male and female kits so that they will be sexually mature in ample time for their first breeding season. It is a decided mistake, however, once that growth and early maturity have been realized, to continue excessive feeding until the animal becomes excessively fat and unfit for use in the breeding herd.

Summer-feeding Adults

After the breeding season is over, the mink males can be changed from ration 2 to ration 3. Nonpregnant females and those with destroyed litters can likewise be changed to the same diet as soon as it is apparent they will produce no young. All other females should be continued on the suckling ration (No. 2) until the young are weaned, at which time the mothers can be switched to the summer maintenance diet.

All animals, both males and females, should be fed as individuals, and given just enough feed twice (or only once) daily to keep them slightly hungry.

BREEDING

Mating

The mating season in the mink occurs principally during March. Eastern minks breed about 10 days earlier than Yukons. As the length of the day increases, the eggs in the ovary become progressively larger before they degenerate. The estrum, or heat period, occurs once a year, but its length is not definitely known. A good rancher can tell by the actions of the female when this period is approaching, which is about the first of March. Matings, however, should not be made until about March 10 in the latitude of Saratoga Springs. Experience has shown that when either animal is not ready, many early matings will be unproductive. In minks the stimulus of copulation is necessary to cause the female to release the mature eggs from the ovary (ovulate), though occasionally fighting will cause ovulation. Even though copulation takes place, the eggs may not be well enough developed to be fertilized or the male may not have mature sperms. In the latter case pseudopregnancy may result. It is easier to obtain matings without the risk of fighting and injury if the season is well-advanced. The chances of failure to conceive are thus reduced.

The female mink can be caught in the nest box or in a special catching box and carried to the desired male. An aggressive male will pursue his mate and attempt service if she is in heat. If in heat she will not strongly resist, but if a fight ensues the pair should be separated and a retrial made later. A service may last 30 to 40 minutes or even longer. A number of ranchers in recent years have followed the

practice of interrupting matings after 15 minutes. This conserves the male.

The first mating each season for each male should be checked for living sperms by a vaginal smear after the animals have separated. If no sperms are present, the female should be placed with another male. The eggs, in all probability, will have been stimulated by the first mating. They will mature, but without sperms they cannot be fertilized. Therefore, every reasonable attempt to obtain matings should now be made. Since the eggs will not be released from the ovary for about 48 hours after the first copulation, sperms deposited as late as the day after should be effective.

Another attempt should be made the next day to breed a female that has copulated. This should insure that plenty of fresh sperms will be waiting for the eggs as they emerge from the ovary. The usual practice of breeding 4, 5, or 6 days after the first copulation is justified, probably, by the impregnation of the few females that did not ovulate at the first breeding. Some females will not breed again, but this is not proof that they are pregnant. Kits should not be mated with pugnacious older animals. It is advisable to try all the adult females at least once before starting with the kits.

Gestation Period

Young may be born 40 to 76 days after mating. The early mated minks have a longer gestation period than the late mated ones and thus the whelping dates are more closely grouped than the breeding dates. The mean length of gestation in mink is about 51 days. Special research studies have demonstrated that the embryonic attachment is for a period only of about 30 to 32 days, regardless of date of breeding. The fertilized eggs float freely during the early part of the gestation period.

Care of Young

The mewing of the kittens, black tarry droppings, and the female being off feed for a day or so will indicate that whelping has occurred. From 4 to 9 kittens are born to a litter. Unless something unforeseen develops they should not be disturbed for a week or so, though the experience of the rancher and his knowledge of the individual animal should be the final deciding factor in the matter. The young minks grow rapidly and when they are about 3 weeks old will begin eating their mother's ration, which she carries to them. Continuous crying of the kits is a good indication that they are hungry or cold and need immediate attention. The young minks will come out of the nest box when 4 or 5 weeks old. What has been called nursing anemia affects some of the producing females when the young are 4 or 5 weeks old. A satisfactory method of handling such animals is to remove the old female and give her a ration high in liver and red meat. The young should also receive special feed and attention. Kits should be weaned when 7 or 8 weeks old, at which time the mother is taken away some distance. A few days later, after the young have ceased to miss their mother, they can be placed in individual pens. Litter mates of one sex may be kept for a few weeks after weaning in the same pen if it is large enough. An average of 4 weaned minks for every adult female on the farm is a good production. Some females, of course, do not breed, and others lose their litters.

HINTS ON MANAGEMENT

Keeping records is most important to good management in the minkery. Recorded information will assist in selecting breeders and in making the desired matings for improvement. Of particular importance are descriptions of density, color, and quality of fur, date and frequency of breeding, animal to which bred, date of whelping, size of litter whelped, distribution of sex and number of young weaned. Certain record sheets showing type and quantity of rations fed during reproduction, summer maintenance, growth and fur development periods will be of considerable value in making proper adjustments later and comparisons from year to year. Cards containing the desired information systematically arranged so that records can be completed merely by checking certain items will facilitate this tedious task. Mental notations may be forgotten or become confused. An identification tag should be on every pen and should be transferred to the new quarters when the mink is moved. Nest boxes should always be kept dry by frequent changes of the fine absorbent bedding. The last cleaning of the nest box before whelping should not be later than 10 days before the expected date of whelping. Narrow mesh hardware cloth or a wooden floor should be placed in the pen at this time as a temporary floor to prevent any small mink from falling through to the ground. Additional bedding can be put into the pen near the nest box and the female will carry it in. The bedding should be changed more frequently when it is full of partly grown minks. In hot weather the minks should be given fresh cool water frequently and it may be necessary to hang wet cloths around the pen or even to wet down the ground or cement floor. The minks should not be unduly disturbed. Careful management, based upon a knowledge of the characteristics of individual animals is necessary to the greatest success in mink raising.

SANITATION

Sanitation is essential for profitable mink raising because it is largely responsible for the health and well-being of the stock. Regular, frequent, and thorough cleaning of pens and nest boxes is highly important in controlling insects and parasites. The free use of a good disinfectant assists materially in controlling parasites and outbreaks or spread of disease. Clean feeding rooms and dishes help prevent digestive disturbances. Precaution in all these matters will be highly profitable.

ANIMALS TO BE PELTED

Some time during August animals to be pelted should be put into individual pens entirely protected from sunlight. Some of the more successful mink farmers have provided suitable furring pens by bending woven wire to form oblong enclosures somewhat smaller than the individual breeding pen, placing these on two logs to raise them about 6 to 8 inches off the ground, and then covering the entire row with tar paper. After pelting, the pens can be stacked and the premises cleaned and disinfected.

It is considered desirable to reduce the percentage of muscle meat in the ration for animals to be pelted and substitute tripe and other non-glandular organs. The proportion of dry mixture should be increased.

The time of pelting varies with locality and season but is usually between November 15 and December 10. The fur then appears to be full of life, glossy and dense, and completely grown out. The condition of the pelt may be determined by catching the animal and blowing into the fur. The exposed skin when it still has a slightly blueish tint is considered by good mink men to be ready for pelting. If creamy white the skin has gone beyond prime and the fur has lost some color.

PELTING OPERATIONS

Killing

There are several methods of killing minks, but most of them are based upon the principle of confinement in a small airtight box having a small hole through which can be introduced some kind of lethal gas, as carbon monoxide from the exhaust of a car, calcium cyanide, chloroform, or carbon tetrachloride. If the gas from the exhaust of a car is use, provision should be made to guard against the hot fumes striking the animal and singeing the fur. An airtight box having 5 or 6 narrow compartments, a common hardware cloth floor, individual entrances, and beneath the floor a removeable metal pan on which to put the cyanogas crystals has proved satisfactory for killing minks at the Station. A quicker and easier method of killing mink has recently been developed by ranchers. The hands must be properly protected with gloves. The right hand grasps the mink just in front of the hind legs, while the left holds the head stretched across the operator's right thigh. By pulling steadily, the head and neck can be stretched out approximately one-half inch, twisted slightly, and then snapped backwards with a quick, left-handed shove. Death is instantaneous.

Skinning

The mink is most easily skinned while the body is still warm but some ranchers prefer to delay skinning about one hour until the fat hardens. A table of proper height equipped with devices to aid in holding the carcass should be used. Some commercial ranchers stretch the hind feet apart fairly tightly and slit the skin from the pad of one foot straight across to the same part of the other. Another long, diagonal cut is made on both sides from the under base of the tail to the original cut. Though this procedure leaves a small triangular-shaped piece of skin on the carcass, it provides an exposed part of the rump of the skin for convenience in examining the fur, if the mink skins are to be sold with the fur side in. A slit is made from the pad up the back of the front leg about 1 inch. The skin is worked free from around all four legs and then cut loose from the carcass just above the feet. If mink scarfs are popular the paws should be skinned out, toe bones clipped close to the skin and left attached to the skin. A short slit is made along the under base of the tail so that, after freeing the skin from the top of the tail with the fingers, the bone can be pulled out with the assistance of a board or iron having a notch of the proper width. The carcass is then hung on a hook or nail by the tendon of the hock joint, and the pelt is pulled down, the knife being used whenever necessary to free it, until it is removed as far as the neck. Careful work is then necessary to cut around the base of the ears, including them on the pelt, around the eyes, and around the mouth and lips. The tail is finally slit on the under side along its entire length, the knife following a grooved guide. An identification tag should be attached to each skin by means of a string through an eye hole.

The pelt should be kept as free as possible from blood, grease, and dirt during these operations. All loose fat and flesh should be removed.

Fleshing and Drying

Before fleshing (scraping), some breeders put the pelt on a drying board and chill in a refrigerator or in a suitable utensil surrounded by ice and salt, or set it aside overnight. Others hang the pelts by the nose in the refrigerator. The fat

will be hardened and, therefore, will be much more easily removed and the pelt is less apt to be damaged in scraping. It is recommended that operations be from the rump towards the head, i.e. with, rather than against, the angle of the fibers. Frozen pelts should be completely thawed out before fleshing is started. Scraping may be done with a special instrument purchased for this purpose, a dull knife, or even a large spoon, the skin having first been slipped over a stationary board beam of the proper size and rounded on the top side, and set at the desired angle for satisfactory work. Scraping is a most important operation. Too close scraping exposes the roots of guard hairs and fur and causes them to come out. It is much better not to scrape enough than to overscrape. Full use should be made of clean, kiln-dried hardwood sawdust and of gunny sack material during the fleshing operations in order to prevent the fur from becoming greasy. The proper technique can be acquired best by experience, consulting successful breeders, and discussing this point with those who have previously used or handled some of your own dressed skins.

Mink raisers who produce a large number of skins prefer to clean and dry them by means of a revolving drum containing hardwood sawdust. This is done with the flesh side out first and again with fur out, using fresh, clean sawdust. The skins are freed from the clinging sawdust by putting them through a special drum-like screen apparatus called a shaker. If drums are not available, the skins should be carefully cleaned with sawdust or burlap and hung up by the nose for a few minutes to dry.

The pelt is finally pulled fur side in or fur side out over a special board for drying. Boards of the proper size and shape can be obtained from supply houses. Do not overstretch the skin as this tends to make it flat in fur and more open in appearance. For best results it is necessary to lift the skin free of the board by the use of long wedges on each side. This permits circulation of air, and is especially desirable if the skin is handled with the fur out, an increasingly common custom, particularly with mutation skins. To make the skin attractive in appearance it is essential that it be placed on the board straight and that the rear legs be arranged in line with the sides of the skin. A good tailoring job will pay dividends. Tack it to the board and set aside to dry away from stove and open blaze. Circulating air at about 65° is ideal.

FUR-FARMING PUBLICATIONS

Mink-farming on a commercial scale is of such recent growth that new and better methods of feeding, breeding, and management are being continually developed through research and in practice on fur farms. Many bits of information along these lines are to be found in fur-farming journals, to one or more of which every mink raiser would do well to subscribe. Undoubtedly the publishers would be glad to send sample copies upon request. A partial list of such publications with the addresses follows:

- American Fur Breeder, 118 North Fourth Avenue, West Duluth, Minn.
- American National Fur and Market Journal, Wausau, Wis.
- Black Fox Magazine, 425 Fourth Avenue, New York 16, N. Y.
- Canadian Silver Fox and Fur, 204 Richmond Street, West., Toronto, Canada.
- Fur Journal, 1008 Western Avenue, Seattle 4, Wash.
- Fur of Canada, 303 Kennedy Street, Winnipeg, Canada.
- Fur Trade Journal of Canada, Box 31, Toronto 2, Canada.
- National Fur News, 444 Seventeenth Street, Denver, Colo.

